

mountain. This structure was not only pleasing to see and extremely strong, but also very economical, for he had constructed a wall that, although not itself solid, had as much strength as one that was, and whose thickness was equivalent to the sagittae of the arches.

I also greatly approve of the technique recommended by Vitruvius, which was practiced by the ancient architects and may be seen throughout Rome, but especially in the wall of Tarquinius;<sup>79</sup> this was to employ the support of buttresses. They do not, however, always follow the rule that the distance between the buttresses should be equal to the height of the structure, but make them distant or close, according to whether the ground is stable or liable to slip, as it were. I have noticed too that the ancient architects were not content with just a single substructure by each *area*, but that they preferred several, like steps,<sup>80</sup> securing the whole slope to the very heart of the mountain; a measure which I feel should not be overlooked.

The stream by Perugia, which flows between Mount Lucino<sup>81</sup> and the hill on which the town itself sits, continually erodes and undermines the foot of the hill, causing the land above it to slide down; this has been responsible for much of the city slipping and falling into ruin.

Consequently, I also very much approve of the numerous chapels that have been added on both sides of the site of the Vatican Basilica;<sup>82</sup> for those built against the wall of the basilica, where dug out of the hillside, are of considerable help and convenience: they support the constant pressure of the slope and intercept any moisture seeping down through the hill, stopping it from entering the building, so that the main wall of the basilica remains dry and therefore stronger. The chapels on either side, at the base of the slope, are quite capable of sustaining the weight of the ground, which had been leveled above them, because of their arched construction and because they buttress any earth movement.

I notice how the architect who built the temple of Latona in Rome showed great ingenuity in designing the building proper as well as its foundations: he set an angle of the site into the hillside on which it sits, so that the pressure of the weight was split between two straight walls, which (being set at an angle) offset the danger by dividing and dissipating the load.<sup>83</sup>

Since we set out to praise the prudence with which the ancients designed their buildings, I would not wish to ignore one particularly relevant example that springs to mind. The architect of St. Mark's in Venice incorporated a most useful measure into the design: for although he made the foundations of the whole church compact and strong, he left a number of shafts running through them, to allow an easy escape to any vapors that might have built up underground.

To conclude: any *area* that you intend to cover with a roof ought to be perfectly level, but those that are to be exposed to the heavens should have

just enough of a fall to allow rainwater to run off. But enough of this topic; we have said more perhaps than the occasion demanded, since many of our comments apply equally to walls. We have thus dealt in the same place with two things that are by nature inseparable. We must now deal with compartition. ♦

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13v—15

All the power of invention, all the skill and experience in the art of building, are called upon in compartition;<sup>84</sup> compartition alone divides up the whole building into the parts by which it is articulated, and integrates its every part by composing all the lines and angles into a single, harmonious work that respects utility, dignity, and delight.<sup>85</sup> If (as the philosophers maintain) the city is like some large house, and the house is in turn like some small city,<sup>86</sup> cannot the various parts of the house—atria, *xysti*,<sup>87</sup> dining rooms, porticoes, and so on—be considered miniature buildings? Could anything be omitted from any of these, through inattention and neglect, without detracting from the dignity and worth of the work? The greatest care and attention, then, should be paid to studying these elements, which contribute to the whole work, so as to ensure that even the most insignificant parts appear to have been formed according to the rules of art.

To achieve this properly, all that has been said above about the locality and the *area* is highly relevant: just as with animals members relate to members, so too in buildings part ought to relate to part; from which arose the saying, "Large buildings should have large members." This was a principle followed by the ancients, who would give everything, including bricks, a larger scale in grand, public buildings than in private ones. Each member should therefore be in the correct zone and position; it should be no larger than utility requires, no smaller than dignity demands, nor should it be strange and unsuitable, but right and proper, so that none could be better;<sup>88</sup> the most noble part of the house, for example, should not be left in some forgotten corner, nor should the most public be hidden away, nor anything private exposed to view. Account should also be taken of the seasons, so that rooms intended for summer use should not be the same as those intended for use in winter, in that they should have different sizes and locations; summer rooms should be more open, nor is it amiss if winter ones are more closed in; summer ones require shade and draught, while winter ones need sunlight. Care must be taken to prevent the inhabitants' moving from a cold place to a hot one, without passing through some intermediate zone, or from a warm place to one exposed to the cold and the wind. This can be very detrimental to the body's health.<sup>89</sup>

The parts ought to be so composed that their overall harmony contributes to the honor and grace of the whole work, and that effort is not expended in adorning one part at the expense of all the rest, but that the harmony is

such that the building appears a single, integral, and well-composed body, rather than a collection of extraneous and unrelated parts.

Moreover, in fashioning the members, the moderation shown by nature ought to be followed; and here, as elsewhere, we should not so much praise sobriety as condemn unruly passion for building: each part should be appropriate, and suit its purpose. For every aspect of building, if you think of it rightly, is born of necessity, nourished by convenience, dignified by use; and only in the end is pleasure provided for, while pleasure itself never fails to shun every excess. Let the building then be such that its members want no more than they already have, and what they have can in no way be faulted.

Then again, I would not wish all the members to have the same shape and size, so that there is no difference between them: it will be agreeable to make some parts large, and good to have some small, while some are valuable for their very mediocrity. It will be equally pleasing to have some members defined by straight lines, others by curved ones, and still others by a combination of the two, provided, of course, that the advice on which I insist is obeyed, and the mistake is avoided of making the building appear like some monster with uneven shoulders and sides. Variety<sup>90</sup> is always a most pleasing spice, where distant objects agree and conform with one another; but when it causes discord and difference between them, it is extremely disagreeable. Just as in music, where deep voices answer high ones, and intermediate ones are pitched between them, so they ring out in harmony, a wonderfully sonorous balance of proportions results, which increases the pleasure of the audience and captivates them; so it happens in everything else that serves to enchant and move the mind.<sup>91</sup>

— This whole process should respect the demands of use and convenience, and follow the methods sanctioned by those who are experienced: to contravene established customs often detracts from the general elegance, while conforming to them is considered advantageous and leads to the best results. Although other famous architects seem to recommend by their work either the Doric, or the Ionic, or the Corinthian, or the Tuscan division as being the most convenient, there is no reason why we should follow their design in our work, as though legally obliged; but rather, inspired by their example, we should strive to produce our own inventions, to rival, or, if possible, to surpass the glory of theirs.<sup>92</sup> We will deal with these matters, however, more thoroughly in the appropriate place, when we consider how the city, the members of the city, and their respective services ought to be disposed.<sup>93</sup> ♦

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15—16

We shall now deal briefly with the outlines of walls. First, however, I would like to mention a precaution I have observed the ancients always took: they never allowed any one side of an *area* to be drawn too far in a straight line

without being broken by being bent into some curve or cut by an angle. Why such experienced men should take this step is obvious: they wanted to reinforce the wall by offering support.

When considering the methods of walling, it is best to begin with its most noble aspects. This is the place therefore where columns should be considered, and all that relates to the column; in that a row of columns is nothing other than a wall that has been pierced in several places by openings. Indeed, when defining the column itself, it may not be wrong to describe it as a certain, solid, and continuous section of wall, which has been raised perpendicularly from the ground, up high, for the purpose of bearing the roof.

There is nothing to be found in the art of building that deserves more care and expense, or ought to be more graceful, than the column. Columns may differ from one another, but we shall deal here with their similarities, with what constitutes their general characteristics; their differences, which determine individual variations, we shall deal with elsewhere, when appropriate.

So to begin from the very roots, as it were, let it first be said that every column has a foundation. Once they had reached floor level, it was customary to build a little wall on top of the foundations which some may call a cushion but which we shall call a pedestal. On this would sit the base, on the base the column was set up, and above that the capital. Columns would be designed so that the lower half would swell out, and the upper contract, the bottom being one part thicker than the top.

In my opinion the column was originally developed to support the roof. Yet it is remarkable that mortals, once they had developed a passion for nobler things, grew concerned to construct buildings that would be permanent, and as far as possible immortal. They therefore built columns, beams, even entire floors and roofs out of marble. In this, ancient architects closely followed nature's example in their desire not to appear to deviate too far from common ways of building; at the same time they took every possible care to ensure that their work would be not only appropriate to its use and structurally sound, but also delightful in appearance. Certainly Nature first supplied us with columns that were round and of wood, but, later, utility demanded that in some places they should be quadrangular. And, if I judge correctly, noticing the bands of iron or bronze incorporated at either end of the wooden columns to prevent them from splitting under the continual load, the architects also attached a wide straplike ring to the very foot of the marble columns to protect them from the splash of raindrops. Likewise at the top they placed another strap, and above that a collar, devices that they had seen used to strengthen wooden columns. As for the bases of the columns, they would ensure that the lowest part would be rectilinear and rectangular, while the upper surface would follow the outline of the column diameter. Further, both the width and the depth of the base would be greater than its height, and proportionally greater than its top, while the